



The Impact of Adolescent Development on Fitness & Conditioning Age and Stage

»» **Youth sports participation offers many benefits if led by qualified coaches, supported by parents and embraced by the players themselves.**

Understanding Youth Development to Support Training and Sports Participation

Coaches are the first line of promotion of sport-based youth development and the first line of defense against overuse, overtraining and burnout among youth athletes. At every stage of youth development there exist evidence-informed

recommendations for the amount of sports-participation experience boys and girls should get relative to practice and competition as well as general guidelines for age-appropriate training strategies to support healthy development and sport success.

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Age and stage. You have probably heard the phrase “Meet kids where they are” and the term “developmentally appropriate.” How can coaches tell where kids are, what they need and what they are ready for? Youth practitioners are encouraged to monitor the age and stage of growth and development for the youth athlete. The stages are often broken down into *early childhood* (ages 5-8), *late childhood* (ages 9-11), *early adolescence* (ages 12-14), *middle adolescence* (ages 15-18) and *late adolescence* (ages 18-21+). The ages given are not absolutes but give a fair idea where children and adolescents are along the developmental continuum.

The period of most rapid growth is called the adolescent growth spurt (aka “adolescent awkwardness”). Girls between 10 and 16 will grow 8 inches and gain 38 pounds; boys between the ages of 12 and 16 will grow an average of 12 inches and gain close to 48 pounds. The growth spurt can have a negative impact on core strength, postural control and performance — including skill, speed, coordination and agility. Adolescent athletes must relearn how to control their bodies in direction changes, changes of pace and acceleration situations: i.e., they must relearn to their balance points and readjust their center of gravity. Particular attention should be paid to the execution of proper biomechanics through all aspects of training for a growing athlete. Coaches, trainers, parents and athletes must also be aware of the athlete’s increased susceptibility to training injuries, especially during and after the adolescent growth spurt. Including a strength-and-conditioning program across ages and stages can help improve performance and reduce the risk of injury.

The National Youth Sports Health & Safety Institute will be the recognized leader and advocate for advancing and disseminating the latest research and evidence-based education, recommendations and policy to enhance the experience, development, health and safety of our youth in sports.

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Table 1. Key Developmental Considerations

Stage (Ages in Years)	Key Developmental Considerations for Fitness and Conditioning
Early Childhood (up to 8)	Physical — introduce a wide variety of key motor skills and strength-and-conditioning movements in playful environments. Psychological — no comparison of skills and abilities. Social — provide low structure and emphasis on fun and positive social interaction.
Middle Childhood (6-12) Early Adolescence (10-14)	Physical — combine key motor skills and introduce how they are used in a variety of sports. Track and monitor peak growth velocity to retrain specific movements and reduce risk of overtraining. Support with semi-structured strength-and-conditioning program introducing a variety of exercises and implements. Psychological — comparison of personal growth and ability mainly against self Social — young athletes will have increased awareness of themselves so create learning environments (e.g., stations) that promote differentiated learning and problem-solving.
Middle Adolescence (15-18)	Physical — focus on mastery of specific sport skills in chosen sport. Support with comprehensive periodized strength-and-conditioning program. Psychological — comparison of personal growth and ability mainly against competition. Focus on correct technique, not PRs, for lifts. Social — strength and conditioning can be a bridge between sports and seasons and among the entire school population.
Late Adolescence (18-21+)	Physical — majority of brain growth, motor skill development has occurred, so complex movement problems can be solved, and a comprehensive strength-and-conditioning program specific to the chosen sport should be implemented. Psychological — correct technique should still be emphasized, including during maximum and/or close-to-maximum attempts. Social — focus on goal-oriented behavior relative to individual and team goals.

»» The Importance of Age- and Stage-Appropriate Strength and Conditioning

One important principle that is frequently missing from youth sports safety recommendations is the need for athletes of all ages and abilities to participate in strength-and-conditioning programs. It is vital that all kids are prepared to meet the rigors of sports participation by participating in a strength-and-conditioning program led by a qualified strength-and-conditioning professional.

A consensus statement supporting the importance of resistance training was endorsed by leading professional organizations within the fields of sports medicine, exercise science and pediatrics (1). Within the consensus statement, as well as other documents supporting the benefits of resistance training for youth sport, physical fitness and physical activity, there have been several key points to consider.^{2,3}

Table 2. Resistance Training Benefit for Youth

Appropriately designed resistance training programs benefit youth of all ages as the potential health and fitness-related benefits of resistance exercise support and encourage participation in physical activity as an ongoing life-style choice later in life.

Children as young as 5-6 years of age can make noticeable improvements in muscular fitness following exposure to basic resistance training exercises using free weights, elastic resistance bands and machine weights.

Muscular strength is important for effective motor skill performance. Youth who do not participate in activities that enhance muscle strength and motor skills early in life may be at increased risk for negative health outcomes later in life.

Practitioners working with youth should systematically progress and individualize training programs for successful long-term athletic development.

»» Coaching Tips

Since not all children enter a strength-and-conditioning program at the same time as they begin playing sports, there exists the important consideration of training age, which is often overlooked or misunderstood. There are three types of training age that interact to influence a young athlete's athletic foundation.

- **Resistance Exercise Training Age** — the amount of experience with performing resistance exercise (applies to each exercise in a program).
- **Technical/Tactical Training Age** — the level of experience developed during sport training, and
- **Developmental/Psychological Age** — the balance of the age of physical development (not just the number of years of age since birth) and subjective psychological age, including how old each athlete feels, acts and behaves.



Taken together, coaches can determine the most developmentally appropriate training schedule for sports practice, including the strength-and-conditioning program, by considering a player's overall training experiences.

Table 3. Application for Youth Sport Coaches

Appropriately designed resistance training programs may reduce sports-related injuries and should be viewed as an essential component of preparatory training programs for aspiring young athletes.

Resistance training prescription should be based according to training age, motor skill competency, technical proficiency and existing strength levels. Qualified professionals should also consider the biological age and psychosocial maturity level of the child or adolescent.

Youth should participate in physical conditioning that helps reduce the risk of injury to ensure their ongoing participation in long-term athletic development programs.

Most effective programs last more than 8 weeks and involve 1-3 sets of 6-15 repetitions in a variety of upper- and lower-body strength exercises. Well-rounded strength-and-conditioning programs that include resistance training; motor skill and balance training; speed and agility training; and appropriate rest reduce the likelihood of experiencing an injury by as much as 50%.

»» Key Take-Home Box

Youth sport coaches are positioned to provide youth developmentally appropriate training at every age and stage to support fitness, flexibility and overall conditioning. Child-centered youth sport policies can enable coaches to provide safe and effective youth programming that meets every child where they are.

References

1. Lloyd RS, Faigenbaum AD, Stone MH et al. Position statement on youth resistance training: the 2014 International Consensus. *Br J Sports Med.* 2014;48(7):498-505.
2. Lloyd RS, Cronin JB, Faigenbaum AD et al. National Strength and Conditioning Association Position Statement on Long-Term Athletic Development. *J Strength Cond Res.* 2016;30(6):1491-509.
3. Faigenbaum AD, Kraemer WJ, Blimkie CJ, Jeffreys I, Micheli LJ, Nitka M, Rowland TW. Youth resistance training: updated position statement paper from the national strength and conditioning association. *J Strength Cond Res.* 2009;23(5 Suppl):S60-79.

*Kristen Dieffenbach, Ph.D., and Rick Howard, D.Sc., CSCS, *D*